in others it is replaced by a fusion of ascogonial nuclei in pairs. After either process the ascogonium becomes septate, and each of its cells gives rise to ascogenous hyphae. In the ascus two nuclei fuse, and three successive divisions result in eight spores, which subsequently become multinucleate. The authors regard Aspergillus as a primitive type of Ascomycetes, from which most of the others can be derived; and suggest that the Ascomycetes are related to the Basidiomycetes and the Florideae.—J. M. C.

**Adventitious buds in leaves of Gnetum.**—In plants of *Gnetum Gnemon* L., grown in a hothouse of the Botanic Garden at Utrecht, the tips of the leaves regularly produced adventitious buds. VAN BEUSEKOM[31] finds that these buds are formed as a result of the attacks of a scale insect, *Aspidirtus dictyospermi* Morg., a species with a world-wide distribution in the tropics and in hothouses. The punctures of this insect result in yellow vesicles at various points on the leaf, and one or more near the apex stimulate the development of endogenous callus buds. The author "explains" the appearance of the buds in the apical part alone of the leaf, by assuming that "the small wound causes an afflux of nutrient matter in an apical direction," and that this necessarily stops just beyond the apical wounds. Of course this is a mere assumption, the like of which is often made, but it would puzzle any of those who use it to show how "an afflux of nutrient matter" could occur before growth actually begins.—C. R. B.

**Conjugation and germination in Spirogyra.**—An examination by TRÖNDLE[32] of several thousand zygospores, some sectioned and some observed entire, confirmed the current account that the two nuclei remain separate for some time after the zygospore is formed. In *Spirogyra communis* the sexual nuclei fuse two or three weeks after the formation of the zygospore. Two successive mitoses giving rise to four nuclei, and a subsequent fusion of two of these nuclei as described by CHMIELEWSKI, do not occur. The male chromatophores in the zygote disorganize in about fourteen days after conjugation, leaving only the chromatophores of the female gamete. The writer also talks about a reduction of the hereditary mass, referring to the nuclear material, but nothing in the text or figures indicates any counting of chromosomes or any study of the mechanism of reduction. The paper contains a detailed account of the chemical changes occurring during the development of the zygospore.—CHARLES J. CHAMBERLAIN.

**Plantae Lindheimerianae.**—To students of the Texan flora ENGELMANN and GRAY'S *Plantae Lindheimerianae*, in two parts, is a classic. It now appears that all of the collections of this pioneer botanist were not published and distributed, and the rich remnant came into the possession of the Missouri Botanical Garden

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[31] VAN BEUSEKOM, JAN, On the influence of wound stimuli on the formation of adventitious buds on the leaves of *Gnetum Gnemon* L. Recueil Trav. Bot. Néerl. **4**:pp. 27. *pls.* 3. 1907.

[32] TRÖNDLE, A., Ueber die Kopulation und Keimung von Spirogyra. Bot. Zeit. **65**:188–216. *pls.* 5. 1907.

with the ENGELMANN herbarium. This unpublished and undistributed material, containing about 650 numbers, represents the collections of 1849–1851, and proves to be very valuable. It has now been published by BLANKINSHIP,[33] who has still further added to the value of the contribution by including also the numbers of the earlier fascicles not previously enumerated (*Plantae Lindheimerianae* having been left unfinished at the end of the Compositae); a bibliography of Texan botany; a complete index of all three parts, with modern equivalents and corrections, the nomenclature comforming to the Vienna code; and a most interesting sketch, with portrait, of "LINDHEIMER, the botanist-editor," from data largely supplied by his son and daughter.—J. M. C.

**Mutation and geographic distribution.**—WILLIS[34] has continued his arguments in favor of mutation by analyzing the geographic distribution of the Dilleniaceae, stating that this family is chosen simply because it is the first family in HOOKER's *Flora of British India* "with other than world-wide distribution." The details of the analysis cannot be given here, but the results are intended to show that the theory of mutation greatly simplifies the problems of geographic distribution.

In another short paper[35] WILLIS suggests what seems to be an important consideration in the origin of species of flowering plants, namely, that "while the characters that distinguish species and genera are largely characters of the floral organs, the struggle for existence is almost entirely among the seedlings and young plants, in which these organs are not yet present."—J. M. C.

**Fertilization in Polytrichum.**—The VAN LEEUWEN-REYNVAANS[36] have published the first account of the details of fertilization in mosses and describe most remarkable behavior by the chromatin. In the next to the last division of the spermatogenous cells each daughter nucleus receives six chromosomes, but in the final mitosis only three, so that the sperm contains only three chromosomes. The mitosis which forms the egg and ventral canal cell shows only three chromosomes for each nucleus. The egg and ventral canal cell become pressed together and their nuclei fuse, forming a nucleus with six chromosomes. Two sperms then unite with this egg, thus restoring the sporophytic number of chromosomes, which was found to be twelve. The full paper with the plates will be awaited with interest.—CHARLES J. CHAMBERLAIN.

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[33] BLANKINSHIP, J. W., Plantae Lindheimerianae, Part III. Ann. Rep. Mo. Bot. Garden **18**:123–223. 1907.

[34] WILLIS, J. C., The geographical distribution of the Dilleniaceae, as illustrating the treatment of this subject on the theory of mutation. Annals Bot. Gard. Peradeniya **4**:69–76. 1907.

[35] Further evidence against the origin of species by infinitesimal variations. *Idem* 17–19.

[36] VAN LEEUWEN-REYNVAAN, Mr. and Mrs. Doctors, On a double reduction of the number of chromosomes during the formation of the sexual cells and on a subsequent double fertilization in some species of Polytrichum. Koninklijke Akad. Wetenschappen **1907**:359–365.